

SEQUENCE LISTING

(1) GENERAL INFORMATION:

5 (i) APPLICANTS: Peter W. Laird, Cindy A. Eads and  
Kathleen D. Danenberg  
(ii) TITLE OF INVENTION: PROCESS FOR HIGH THROUGHPUT DNA  
METHYLATION ANALYSIS

(iii) NUMBER OF SEQUENCES: 54

10 (iv) CORRESPONDENCE ADDRESS:

(A) ADDRESSEE: Davis Wright Tremaine LLP

(B) STREET: 1501 Fourth Avenue  
2600 Century Square

(C) CITY: Seattle

15 (D) STATE: Washington

(E) COUNTRY: USA

(F) ZIP: 98101-1688

(v) COMPUTER READABLE FORM:

(A) MEDIUM TYPE: Diskette-3.5 inch, 1.44 MB

20 storage

(B) COMPUTER: PC compatible

(C) OPERATING SYSTEM: Windows 95

(D) SOFTWARE: Word 97

(vi) CURRENT APPLICATION DATA:

(A) APPLICATION NUMBER:

(B) FILING DATE:

(C) CLASSIFICATION:

(vii) PRIOR APPLICATION DATA: N/A

(A) APPLICATION NUMBER: N/A

(B) FILING DATE: N/A

(viii) ATTORNEY/AGENT INFORMATION:

(A) NAME: Jeffrey B. Oster

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(C) REFERENCE/DOCKET NUMBER: 47675-9

35 (xi) TELECOMMUNICATION INFORMATION:

(A) TELEPHONE: (206) 628-7711

(B) TELEFAX: (206) 628-7699

(2) INFORMATION FOR SEQ ID NO:1:

(i) SEQUENCE CHARACTERISTICS:

40 (A) LENGTH: 19 base pairs

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA

45 (iii) HYPOTHETICAL: No

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:1:

GGCGTTCGTT TTGGGATTG

19

(2) INFORMATION FOR SEQ ID NO:2:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 24 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA

(iii) HYPOTHETICAL: No

(ix) FEATURE:

((A) NAME/KEY: 5' substitution with fluorescent reporter dye 6FAM (2,7-dimethoxy-4,5-dichloro-6-carboxy-fluorescein-phosphoramidite-cytosine); 3' substitution with quencher dye TAMRA (6-carboxytetramethylrhodamine).

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:2:

CGATAAAACC GAACGACCCG ACGA 24

(2) INFORMATION FOR SEQ ID NO:3:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 19 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA

(iii) HYPOTHETICAL: No

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:3:

GCCGACACGC GAACTCTAA 19

(2) INFORMATION FOR SEQ ID NO:4:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 23 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (d) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA

(iii) HYPOTHETICAL: No

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:4:

ACACATATCC CACCAACACA CAA 23

(2) INFORMATION FOR SEQ ID NO:5:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 30 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single

- (D) TOPOLOGY: linear
- (ii) MOLECULE TYPE: DNA
- (iii) HYPOTHETICAL: No
- (ix) FEATURE:

(A) NAME/KEY: 5' substitution with fluorescent reporter dye 6FAM (2,7-dimethoxy-4,5-dichloro-6-carboxy-fluorescein-phosphoramidite-cytosine); 3' substitution with quencher dye TAMRA (6-carboxytetramethylrhodamine).

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:5:

CAACCCTACC CCAAAAACCT ACAAATCCAA 30

(2) INFORMATION FOR SEQ ID NO:6:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 21 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA

(iii) HYPOTHETICAL: No

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:6:

AGGAGTTGGT GGAGGGTGTT T 21

(2) INFORMATION FOR SEQ ID NO:7:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 18 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA

(iii) HYPOTHETICAL: No

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:7:

CTATCGCCGC CTCATCGT 18

(2) INFORMATION FOR SEQ ID NO:8:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 22 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA

(iii) HYPOTHETICAL: No

(ix) FEATURE:

(A) NAME/KEY: 5' substitution with fluorescent reporter dye 6FAM (2,7-dimethoxy-4,5-dichloro-6-carboxy-fluorescein-phosphoramidite-cytosine); 3' substitution with

quencher dye TAMRA (6-carboxytetramethylrhodamine).  
(xi) SEQUENCE DESCRIPTION: SEQ ID NO:8:

CGCGACGTCA AACGCCACTA CG 22

(2) INFORMATION FOR SEQ ID NO:9:

- (i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 30 base pairs  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA

(iii) HYPOTHETICAL: No

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:9:

CGTTATATAT CGTTCGTAGT ATTCGTGTTT 30

(2) INFORMATION FOR SEQ ID NO:10:

- (i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 27 base pairs  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA

(iii) HYPOTHETICAL: No

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:10:

TTATATGTCG GTTACGTGCG TTTATAT 27

(2) INFORMATION FOR SEQ ID NO:11:

- (i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 22 base pairs  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA

(iii) HYPOTHETICAL: No

(ix) FEATURE:

(A) NAME/KEY: 5' substitution with fluorescent reporter dye 6FAM (2,7-dimethoxy-4,5-dichloro-6-carboxy-fluorescein-phosphoramidite-cytosine); 3' substitution with quencher dye TAMRA (6-carboxytetramethylrhodamine).

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:11:

CCCGTCGAAA ACCCGCCGAT TA 22

(2) INFORMATION FOR SEQ ID NO:12:

- (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 19 base pairs  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: linear  
5 (ii) MOLECULE TYPE: DNA  
(iii) HYPOTHETICAL: No  
(xi) SEQUENCE DESCRIPTION: SEQ ID NO:12:

GAACCAAAC GCTCCCCAT 19

- 10 (2) INFORMATION FOR SEQ ID NO:13:  
(i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 25 base pairs  
(B) TYPE: nucleic acid  
15 (C) STRANDEDNESS: single  
(D) TOPOLOGY: linear  
(ii) MOLECULE TYPE: DNA  
(iii) HYPOTHETICAL: No  
(xi) SEQUENCE DESCRIPTION: SEQ ID NO:13:

GGGTTGTGAG GGTATATTTT TGAGG 25

- 20 (2) INFORMATION FOR SEQ ID NO:14:  
(i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 28 base pairs  
(B) TYPE: nucleic acid  
25 (C) STRANDEDNESS: single  
(D) TOPOLOGY: linear  
(ii) MOLECULE TYPE: DNA  
(iii) HYPOTHETICAL: No  
30 (ix) FEATURE:  
(A) NAME/KEY: 5' substitution with fluorescent  
reporter dye 6FAM (2,7-dimethoxy-4,5-dichloro-6-carboxy-  
fluorescein-phosphoramidite-cytosine); 3' substitution with  
35 quencher dye TAMRA (6-carboxytetramethylrhodamine).  
(xi) SEQUENCE DESCRIPTION: SEQ ID NO:14:

CCCACCCAAC CACACAACCT ACCTAACC 28

- 40 (2) INFORMATION FOR SEQ ID NO:15:  
(i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 22 base pairs  
(B) TYPE: nucleic acid  
45 (C) STRANDEDNESS: single  
(D) TOPOLOGY: linear  
(ii) MOLECULE TYPE: DNA  
(iii) HYPOTHETICAL: No  
(xi) SEQUENCE DESCRIPTION: SEQ ID NO:15:

CCAACCCACA CTCCACAATA AA 22

(2) INFORMATION FOR SEQ ID NO:16:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 19 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA

(iii) HYPOTHETICAL: No

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:16:

AACAACGTCC GCACCTCCT 19

(2) INFORMATION FOR SEQ ID NO:17:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 18 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA

(iii) HYPOTHETICAL: No

(ix) FEATURE:

(A) NAME/KEY: 5' substitution with fluorescent reporter dye 6FAM (2,7-dimethoxy-4,5-dichloro-6-carboxy-fluorescein-phosphoramidite-cytosine); 3' substitution with quencher dye TAMRA (6-carboxytetramethylrhodamine).

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:17:

ACCCGACCCC GAACCGCG 18

(2) INFORMATION FOR SEQ ID NO:18:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 22 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA

(iii) HYPOTHETICAL: No

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:18

TGGAATTTTC GGTGATTGG TT 22

(2) INFORMATION FOR SEQ ID NO:19:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 24 base pairs
- (B) TYPE: nucleic acid

- (C) STRANDEDNESS: single  
(D) TOPOLOGY: linear  
(ii) MOLECULE TYPE: DNA  
(iii) HYPOTHETICAL: No  
(xi) SEQUENCE DESCRIPTION: SEQ ID NO:19:

CAACCAATCA ACCAAAAATT CCAT 24

(2) INFORMATION FOR SEQ ID NO:20

- (i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 28 base pairs  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA

(iii) HYPOTHETICAL: No

(ix) FEATURE:

(A) NAME/KEY: 5' substitution with fluorescent reporter dye 6FAM (2,7-dimethoxy-4,5-dichloro-6-carboxy-fluorescein-phosphoramidite-cytosine); 3' substitution with quencher dye TAMRA (6-carboxytetramethylrhodamine).

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:20:

CCACCACCCA CTATCTACTC TCCCCCTC 28

(2) INFORMATION FOR SEQ ID NO:21:

- (i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 22 base pairs  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA

(iii) HYPOTHETICAL: No

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:21:

GGTGGATTGT GTGTGTTTGG TG 22

(2) INFORMATION FOR SEQ ID NO:22:

- (i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 23 base pairs  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA

(iii) HYPOTHETICAL: No

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:22:

CCAACTCCAA ATCCCCTCTC TAT 23

(2) INFORMATION FOR SEQ ID NO:23:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 36 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA

(iii) HYPOTHETICAL: No

(ix) FEATURE:

(A) NAME/KEY: 5' substitution with fluorescent reporter dye 6FAM (2,7-dimethoxy-4,5-dichloro-6-carboxy-fluorescein-phosphoramidite-cytosine); 3' substitution with quencher dye TAMRA (6-carboxytetramethylrhodamine).

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:23:

TCCCTTCCTA TTCCTAAATC CAACCTAAAT ACCTCC 36

(2) INFORMATION FOR SEQ ID NO:24:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 30 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA

(iii) HYPOTHETICAL: No

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:24:

TGATTAATTT AGATTGGGTT TAGAGAAGGA 30

(2) INFORMATION FOR SEQ ID NO:25:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 18 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA

(iii) HYPOTHETICAL: No

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:25:

TGAGCGCGGC TACAGCTT 18

(2) INFORMATION FOR SEQ ID NO:26:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 18 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear



- (ii) MOLECULE TYPE: DNA
- (iii) HYPOTHETICAL: No
- (ix) FEATURE:

(A) NAME/KEY: 5' substitution with fluorescent reporter dye 6FAM (2,7-dimethoxy-4,5-dichloro-6-carboxy-fluorescein-phosphoramidite-cytosine); 3' substitution with quencher dye TAMRA (6-carboxytetramethylrhodamine).

- (xi) SEQUENCE DESCRIPTION: SEQ ID NO:26:

10 ACCACCACGG CCGAGCGG 18

(2) INFORMATION FOR SEQ ID NO:27:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 20 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA

(iii) HYPOTHETICAL: No

- (xi) SEQUENCE DESCRIPTION: SEQ ID NO:27:

CCTTAATGTC ACACACGATT 20

(2) INFORMATION FOR SEQ ID NO:28:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 22 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA

(iii) HYPOTHETICAL: No

- (xi) SEQUENCE DESCRIPTION: SEQ ID NO:28:

GTTCTCCGGG AGATGTTGCA TA 22

(2) INFORMATION FOR SEQ ID NO:29:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 22 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA

(iii) HYPOTHETICAL: No

- (ix) FEATURE:

(A) NAME/KEY: 5' substitution with fluorescent reporter dye 6FAM (2,7-dimethoxy-4,5-dichloro-6-carboxy-fluorescein-phosphoramidite-cytosine); 3' substitution with quencher dye TAMRA (6-carboxytetramethylrhodamine).

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:29:

CCTCAGTGGG CCTTGGCACA GC 22

5 (2) INFORMATION FOR SEQ ID NO:30:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 26 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

10 (ii) MOLECULE TYPE: DNA

(iii) HYPOTHETICAL: No

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:30:

15 TGGTGGTGTG GAGAAGGTAT AACTTG 26

(2) INFORMATION FOR SEQ ID NO:31:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 20 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA

(iii) HYPOTHETICAL: No

(x) PUBLICATION INFORMATION:

(A) AUTHORS: Parsons, et al

(B) TITLE: Microsatellite Instability and Mutations  
of the Transforming Growth Factor B Type II Receptor Gene in  
Colorectal Cancer

(C) JOURNAL: Cancer Res.

(D) VOLUME: 55

(F) PAGES: 5548-5550

(G) DATE: 01-DEC-1995

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:31:

35 TCGCCTCCAA GAATGTAAGT 20

(2) INFORMATION FOR SEQ ID NO:32:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 21 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA

(iii) HYPOTHETICAL: No

(x) PUBLICATION INFORMATION:

(A) AUTHORS: Parsons, et al

(B) TITLE: Microsatellite Instability and Mutations

of the Transforming Growth Factor B Type II Receptor Gene in  
Colorectal Cancer

(C) JOURNAL: Cancer Res.

(D) VOLUME: 55

(F) PAGES: 5548-5550

(G) DATE: 01-DEC-1995

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:32:

TCTGCATTTT AACTATGGCT C 21

(2) INFORMATION FOR SEQ ID NO:33:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 21 base pairs

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA

(iii) HYPOTHETICAL: No

(x) PUBLICATION INFORMATION:

(A) AUTHORS: Parsons, et al

(B) TITLE: Microsatellite Instability and Mutations  
of the Transforming Growth Factor B Type II Receptor Gene in  
Colorectal Cancer

(C) JOURNAL: Cancer Res.

(D) VOLUME: 55

(F) PAGES: 5548-5550

(G) DATE: 01-DEC-1995

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:33:

TGACTACTTT TGACTTCAGC C 21

(2) INFORMATION FOR SEQ ID NO:34:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 22 base pairs

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA

(iii) HYPOTHETICAL: No

(x) PUBLICATION INFORMATION:

(A) AUTHORS: Parsons, et al

(B) TITLE: Microsatellite Instability and Mutations  
of the Transforming Growth Factor B Type II Receptor Gene in  
Colorectal Cancer

(C) JOURNAL: Cancer Res.

(D) VOLUME: 55

(F) PAGES: 5548-5550

(G) DATE: 01-DEC-1995

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:34:

AACCATTCAA CATTTTAAAC CC 22

5 (2) INFORMATION FOR SEQ ID NO:35:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 21 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

10

(ii) MOLECULE TYPE: DNA

(iii) HYPOTHETICAL: No

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:35:

15 TCCTAAAACT ACACTTACTC C 21

(2) INFORMATION FOR SEQ ID NO:36:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 23 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

20

(ii) MOLECULE TYPE: DNA

(iii) HYPOTHETICAL: No

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:36:

25

GGTTATTGG AAAAAGAGTA TAG 23

(2) INFORMATION FOR SEQ ID NO:37:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 22 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

30

(ii) MOLECULE TYPE: DNA

(iii) HYPOTHETICAL: No

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:37:

35

AGAGAGAAGT AGTTGTGTTA AT 22

40

(2) INFORMATION FOR SEQ ID NO:38:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 21 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

45

(ii) MOLECULE TYPE: DNA

(iii) HYPOTHETICAL: No

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:38:

ACTACACCAA TACAACCACA T 21

5 (2) INFORMATION FOR SEQ ID NO:39:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 12 base pairs

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

10 (ii) MOLECULE TYPE: DNA

(iii) HYPOTHETICAL: No

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:39:

15 AAACCAAAC TC 12

(2) INFORMATION FOR SEQ ID NO:40:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 16 base pairs

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA

(iii) HYPOTHETICAL: No

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:40:

20 CCCACACCCA ACCAAT 16

(2) INFORMATION FOR SEQ ID NO:41:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 23 base pairs

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA

(iii) HYPOTHETICAL: No

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:41:

30 GGAGGTTATA AGAGTAGGGT TAA 23

(2) INFORMATION FOR SEQ ID NO:42:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 24 base pairs

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA

(iii) HYPOTHETICAL: No

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:42:

CCAACCAATA AAAACAAAAA TACC 24

5 (2) INFORMATION FOR SEQ ID NO:43:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 22 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

10

(ii) MOLECULE TYPE: DNA

(iii) HYPOTHETICAL: No

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:43:

15 GTAGGTGGGG AGGAGTTTAG TT 22

(2) INFORMATION FOR SEQ ID NO:44:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 23 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

20

(ii) MOLECULE TYPE: DNA

(iii) HYPOTHETICAL: No

25

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:44:

TCTAATAACC AACCAACCCC TCC 23

(2) INFORMATION FOR SEQ ID NO:45:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 27 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

30

(ii) MOLECULE TYPE: DNA

(iii) HYPOTHETICAL: No

35

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:45:

TTGTATTATT TTGTTTTTTT TGGTAGG 27

40

(2) INFORMATION FOR SEQ ID NO:46:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 26 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

45

(ii) MOLECULE TYPE: DNA

(iii) HYPOTHETICAL: No

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:46:

CAACTTCTCA AATCATCAAT CCTCAC 26

5 (2) INFORMATION FOR SEQ ID NO:47:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 21 base pairs

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

10

(ii) MOLECULE TYPE: DNA

(iii) HYPOTHETICAL: No

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:47:

15 TTTAGTAGAG GTATATAAGT T 21

(2) INFORMATION FOR SEQ ID NO:48:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 26 base pairs

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

20

(ii) MOLECULE TYPE: DNA

(iii) HYPOTHETICAL: No

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:48:

25

TAAGGGGAGA GGAGGAGTTT GAGAAG 26

(2) INFORMATION FOR SEQ ID NO:49:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 15 base pairs

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

30

(ii) MOLECULE TYPE: DNA

(iii) HYPOTHETICAL: No

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:49:

35

TTTGAGGGAT AGGGT 15

40

(2) INFORMATION FOR SEQ ID NO:50:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 18 base pairs

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

45

(ii) MOLECULE TYPE: DNA

(iii) HYPOTHETICAL: No

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:50:

TTTTAGGGGT GTTATATT 18

5 (2) INFORMATION FOR SEQ ID NO:51:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 21 base pairs

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA

(iii) HYPOTHETICAL: No

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:51:

15 TTTTTTTGTT TGGAAAGATA T 21

(2) INFORMATION FOR SEQ ID NO:52:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 16 base pairs

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA

(iii) HYPOTHETICAL: No

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:52:

20 GTTGGTGGTG TTGTAT 16

(2) INFORMATION FOR SEQ ID NO:53:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 19 base pairs

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA

(iii) HYPOTHETICAL: No

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:53:

30 AGGTTATGAT GATGGGTAG 19

(2) INFORMATION FOR SEQ ID NO:54:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 22 base pairs

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA

(iii) HYPOTHETICAL: No



TATTAGAGGT AGTAATTATG TT 22

TATTAGAGGT AGTAATTATG TT

22

[illegible]